

REMARKS

Claims 24, 29, 33, 41, 43, and 45 are amended; and claims 28, 39-40, and 46 are canceled, without prejudice or disclaimer. Claims 24-27, 29-38, and 41-45 are pending.

The amendments to the claims are based on the application as originally filed. In particular, the amendment to claim 24, reciting that a plurality of junctions are positioned within apertures of a sheath, is supported by FIGS. 3 and 6-8. Therefore, it is respectfully submitted that no new matter has been added.

In the office action, claims 40-41 were objected to as being dependent upon a rejected base claim, but it is stated that claims 40-41 would be allowable if rewritten in independent form including all the limitations of the base claim and any intervening claims.

Instead, claim 33 is amended such that the allowable subject matter of claim 40 and intervening claim 39 are added to independent claim 33, and claims 39-40 are canceled. Claims 34-38 and 41-42 depend from independent claim 33. Accordingly, claims 33-38 and 41-42 are allowable.

In addition, claim 43 is amended such that the allowable subject matter of claim 40 as well as the subject matter of claim 46 are added to independent method claim 43, and claims 44-45 depend from independent claim 43. Claim 46 is canceled. Accordingly, claims 43-45 are also allowable.

In the office action, claims 24-27 and 30 were rejected under 35 U.S.C. § 103(a) as being obvious in view of U.S. Patent Numbers 4,428,686 to Brax, 4,984,904 to Nakano et al., and implicitly 2,397,901 to Zimmerman; claims 28-29 were rejected under 35 U.S.C. § 103(a) as being obvious in view of Brax and Nakano as well as U.S. Patent Number 6,098,457 to Poole;

claims 24 and 28-29 were rejected under 35 U.S.C. § 103(a) as being obvious in view of Nakano and U.S. Patent Number 4,919,543 to Davis; claims 31-32 were rejected under 35 U.S.C. § 103(a) as being obvious in view of Brax, Nakano, and U.S. Patent Number 5,178,009 to Arekapudi et al.; claims 31-32 were rejected under 35 U.S.C. § 103(a) as being obvious in view of Davis, Nakano, and Arekapudi; claims 33-36 and 42-44 were rejected under 35 U.S.C. § 103(a) as being obvious in view of Brax, Nakano, and U.S. Patent Number 4,915,145 to Schirmacher; claims 33-36 and 42-44 were rejected under 35 U.S.C. § 103(a) as being obvious in view of Davis, Nakano, and Schirmacher; claims 37-38 were rejected under 35 U.S.C. § 103(a) as being obvious in view of Brax, Nakano, Schirmacher, and Arekapudi; claims 37-38 were rejected under 35 U.S.C. § 103(a) as being obvious in view of Davis, Nakano, Schirmacher, and Arekapudi; claims 39 and 46 were rejected under 35 U.S.C. § 103(a) as being obvious in view of Brax, Nakano, Schirmacher, and U.S. Patent Number 6,202,486 to Kemp; claims 39 and 46 were rejected under 35 U.S.C. § 103(a) as being obvious in view of Davis, Nakano, Schirmacher, and U.S. Patent Number 6,202,486 to Kemp; claim 45 was rejected under 35 U.S.C. § 103(a) as being obvious in view of Davis, Nakano, Schirmacher, and Japanese document number JP62261928; claim 45 was rejected under 35 U.S.C. § 103(a) as being obvious in view of Brax, Nakano, Schirmacher, and Japanese document number JP62261928; claim 45 was rejected under 35 U.S.C. § 103(a) as being obvious in view of Brax, Nakano, Schirmacher, and U.S. Patent Number 5,228,329 to Dennison; claim 46 was rejected under 35 U.S.C. § 103(a) as being obvious in view of Davis, Nakano, Schirmacher, and U.S. Patent Number 7,004,625 to Egidio; and claim 46 was rejected under 35 U.S.C. § 103(a) as being obvious in view of Brax, Nakano, Schirmacher, and U.S. Patent Number 7,004,625 to Egidio.

As stated herein, claims 33 and 43 are amended to recite allowable subject matter, and so claims 33-38 and 41-45 are allowable.

Regarding claims 24-32, independent claim 24 is amended to recite the subject matter of claim 28 regarding a sheath surrounding the rod, with the sheath having a plurality of apertures through an outer surface of the sheath and extending along the longitudinal length of the rod, as well as additionally reciting that, within the apertures, the plurality of junctions are respectively positioned to be exposed to and to directly contact the liquid material.

That is, the plurality of junctions are not only adjacent to the apertures of the sheath, but also the junctions are positioned within the apertures of the sheath. Claim 24, as amended, as well as claims 25-27 and 29-32 which depend from amended claim 24, are patentable over the cited art, and so are in condition for allowance, since the cited art does not disclose or suggest all of the elements, steps, and features of the present invention, and one having ordinary skill in the art would not look to the cited art for the elements, steps, and features of the present invention.

Each of Brax, Nakano, Zimmerman, Poole, and Davis fails to disclose or suggest a probe with a rod having junctions exposed to and directly contacting liquid material, and with a sheath completely surrounding the rod with apertures in the sheath, and with the junctions positioned within the apertures of the sheath.

Brax does not have the junctions 14 directly contact the liquid material, but instead the junctions 14 are surrounded by sheaths 15 without apertures, as well as surrounded by cement 16 and a rod 5 and tip 6.

Nakano also does not have the junction or thermocouple 8 directly contact the liquid material, but instead the junction 8 is surrounded by a protection tube 6 without apertures.

Zimmerman merely shows a tube 16 inserted into openings 17, 19 in a wall of a container, but the tube 16 lacks a sheath or apertures along a longitudinal length of the sheath or openings 17, 19.

Davis shows a rod with a plurality of junctions 16 exposed to the liquid material, and metal section members 18, 20 partially surrounding the rod. However, members 18, 20 are not a full surrounding sheath, and such member 18, 20 lack apertures with the junctions 16 positioned therein, and the partial surrounding of the rod does not completely surround and protect the rod.

Poole does not have a sheath with apertures therethrough, but instead has a housing 12 with a tubular shape with openings 16 such that the liquid material fills the housing 12 to the same level 17 as outside the housing 12 and with the liquid material contacting a sensor element 20 therein, as described in Poole, column 3, lines 2-9. In addition, the sensor element 20 is a singular member which is not mounted in a rod within a sheath or within the housing 12.

Accordingly, the sensor element 20 of Poole is not positioned within apertures of a sheath completely surrounding a rod, as in amended claim 24.

One having ordinary skill in the art would not combine Brax, Nakano, Zimmerman, Poole, and Davis to provide the present invention of amended claim 24, since there is no motivation or suggestions in any of the references to completely surround a rod in a protective sheath, with junctions positioned within apertures of the sheath for directly contacting liquid material, as in amended claim 24.

The remaining cited art fail to cure the deficiencies of Brax, Nakano, Zimmerman, Poole, and Davis, since the remaining cited art also does not disclose or suggest the elements and features of the present invention which each of Brax, Nakano, Zimmerman, Poole, and Davis lacks.

Accordingly, independent claim 24, as amended, and dependent claims 25-27 and 29-33 are patentable over the cited art, so reconsideration and withdrawal of the rejection are respectfully requested.

Entry and approval of the present amendment and allowance of all pending claims are respectfully requested.

In case of any deficiencies in fees by the filing of the present amendment, the Commissioner is hereby authorized to charge such deficiencies in fees to Deposit Account Number 01-0035.

Respectfully submitted,



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